[0023] **FIG. 7** is a schematic of a top view of a syringe bank in accordance with one embodiment of the present invention;

[0024] **FIG. 8** is a schematic showing a humidification scheme for droplets on a moving surface in accordance with one embodiment of the present invention;

[0025] **FIG. 9** is a schematic of a valve assemble that removes the sample to be interrogated from the moving surface by aspiration in accordance with one embodiment of the present invention;

[0026] **FIG. 10** is a schematic of the valve assembly of **FIG. 10** when the sample is being aspirated in accordance with one embodiment of the present invention;

[0027] **FIG. 11** is a schematic of the valve assembly of **FIG. 10** when the sample is being presented for mass spectrometry in accordance with one embodiment of the present invention;

[0028] **FIG. 12** is a schematic of a piezo-electric unit assembly that removes the sample to be interrogated from the moving surface by aspiration in accordance with one embodiment of the present invention;

[0029] **FIG. 13** is a schematic of a piezo-electric unit assembly dispensing a sample in a stream of very small droplets towards the inlet of a mass spectrometer in accordance with one embodiment of the present invention;

[0030] **FIG. 14** is a schematic of a piezo-electric unit assembly dispensing a sample in the form of a stream of micro-droplets to a surface proximal to the inlet surface of a mass spectrometer in accordance with one embodiment of the present invention;

[0031] **FIG. 15** is a schematic of a piezo-electric unit assembly dispensing a sample in the form of a high speed stream of micro-droplets at the point of a sharp pin or needle towards the inlet of a mass spectrometer in accordance with one embodiment of the present invention;

[0032] **FIG. 16** is a schematic of a piezo-electric unit assembly dispensing a sample in the form of a high speed stream of micro-droplets at a fine mesh towards the inlet of a mass spectrometer in accordance with one embodiment of the present invention;

[0033] **FIG. 17** is a schematic of a piezo-electric assembly dispensing a sample in the form of a high speed stream of micro-droplets at a hole in a parabolic mirror towards the inlet of a mass spectrometer, the stream being collinear with a light beam from a laser, in accordance with one embodiment of the present invention;

[0034] **FIG. 18** is a schematic of a system for rapidly heating samples on a moving surface so as to cause atomization in accordance with one embodiment of the present invention;

[0035] **FIG. 19** is a schematic of a system for forcibly ejecting a sample from a moving surface in accordance with one embodiment of the present invention;

[0036] **FIG. 20** is a schematic of a system for rapidly vibrating samples on a moving surface so as to cause atomization in accordance with one embodiment of the present invention; and

[0037] **FIG. 21** is a schematic of a system for rapidly vibrating samples on a moving surface so as to cause atomization using a vibrating probe, in accordance with one embodiment of the invention.

DETAILED DESCRIPTION

[0038] Various methods and systems for the high throughput processing of a plurality of droplets are presented. A droplet may be referred to herein and in the appended claims as a "microdroplet" or a "sample," and may include droplets containing living cells, such as yeast cells, for example, and may, more particularly, include droplets carrying a single living cell per droplet.

[0039] **FIG. 1** is a schematic of a high throughput processing system **8** according to one embodiment of the invention. The system includes a moving surface **1**, a compound reformatter **2**, a reagent addition station **3**, an environmental delay chamber **4**, computer control **9**, and at least one analyzer, such as a mass spectrometer **5**, for example. Each of these elements in the system will now be covered in detail.

[0040] The Moving Surface

[0041] As shown in **FIG. 1**, moving surface **1** connects various components of the high throughput screening system **8** together. Moving surface **1** may be a belt, tape, conveyor, or web, which, while used interchangeably throughout this document, may advantageously be chosen for particular applications. While the moving surface **1** may simply act as a transport mechanism, in preferred embodiments of the invention, the moving surface **1** also plays an active part in the assay physics or chemistry, such as binding, separation, or filtration. The moving surface **1** may be a simple one-layer film that is driven by friction, or it can be a multilayer composite with a surface specifically designed for a specified assay to be performed. Additionally, moving surface **1** can take the form of a fiber. In a preferred embodiment of the invention, moving surface **1** is similar to a timing belt with teeth for engagement by a sprocket such that accurate and robust positioning of the belt is facilitated. Moving surface **1** may move continuously, or with a discontinuous start/stop action.

[0042] While moving surface **1** may be of fixed length, being unwound from an unwind station as required, and with splices employed when more length is required, moving surface **1** may also be joined end to end, as shown in **FIG. 1**. In this manner, splices are not required when additional length is needed, and uniform tensioning is facilitated.

[0043] In order to provide a surface that is optimized for the assay in question, in various embodiments of the invention moving surface **1** is designed such that the top surface is physically, chemically, or biologically active. Alternatively, the surface can be prepared online, such as by corona treatment.

[0044] In a preferred embodiment of the invention, a laminate **6**, which may be a tape, is applied to the moving surface **1**. Laminate **6** may be permanently bonded to moving surface **1**. Alternatively, laminate **6** may be attached temporarily to the moving surface **1** for removal at a later time. In a preferred embodiment, as shown in **FIG. 1, a** tape **6** is spooled to the top surface of a moving belt **1**, and removed and rewound after analysis is complete. In this